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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,531	09/16/2003	Harry L. Tuller	MIT9983	3582
25276	7590	07/13/2005	EXAMINER	
SAMUELS, GAUTHIER & STEVENS LLP 225 FRANKLIN ST BOSTON, MA 02110			RICHARDS, N DREW	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/663,531

**Applicant(s)**

TULLER ET AL.

**Examiner**

N. Drew Richards

**Art Unit**

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group II, claims 11-20, in the reply filed on 10/27/04 is acknowledged.

### ***Product-by-Process Limitations***

2. While not objectionable, the Office reminds Applicant that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 11-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Sano et al. (U.S. Patent No. 6,664,565 B1).

With regard to claim 11, Sano et al. disclose in figures 1-8 and on columns 1-10, for example, a wide band gap semiconductor device. Sano et al. disclose a device comprising an acceptor-doped material having ZnO 315 (figure 6, layer 315 is N-doped p-type; it is noted that p-type is the common nomenclature for "acceptor-doped"). The limitations of being formed under reducing conditions and being annealed at intermediate temperatures under oxidizing conditions to remove intrinsic donors are product-by-process limitations that do not structurally distinguish over the prior art. The limitation of insuring a high donor density is a limitation dealing with the intermediate product formed during the process steps recited and therefore does not add any structural limitation to the final product of the acceptor-doped material.

With regard to claim 16, Sano et al. disclose a p-n junction comprising an acceptor-doped material having ZnO 315 (the p-n junction is formed between layers 311 and 315; layer 315 is "acceptor-doped" as explained above). The limitations of being

Art Unit: 2815

formed under reducing conditions and being annealed at intermediate temperatures under oxidizing conditions to remove intrinsic donors are product-by-process limitations that do not structurally distinguish over the prior art. The limitation of insuring a high donor density is a limitation dealing with the intermediate product formed during the process steps recited and therefore does not add any structural limitation to the final product of the acceptor-doped material.

With regards to claims 12, 13, 15, 17, 18 and 20, the limitations dealing with the reducing conditions and the intermediate temperatures are merely further defining the process portions of the product-by-process limitations of claims 11 and 16. These limitations are not considered to necessitate any further structure or to necessarily distinguish the structure claimed over the prior art. Sano et al. disclose the same final structure and thus anticipate the structure as claimed.

With regard to claims 14 and 19, the acceptor-doped material comprises a substrate 301/305, a n-type ZnO layer 311 deposited on the substrate, and a p-type layer 315 deposited on the n-type ZnO layer (figure 6).

### ***Response to Arguments***

5. Applicant's arguments received 5/2/05 have been fully considered but they are not persuasive.

Applicant has argued that Sano et al. does not teach an acceptor-doped material having ZnO. This is not persuasive as Sano et al. clearly states on column 6 lines 65-66 "an N-doped **p-type** high temperature growth **ZnO** single crystal layer." As readily

Art Unit: 2815

understood by one of ordinary skill in the art, and as explained in the rejections above and in the rejection of the previous Office Action, "p-type" is the common nomenclature for "acceptor-doped." As is well known in the art, p-type refers to acceptor sites and thus a p-type layer is acceptor doped.

Applicant has also argued that Sano et al. does not teach the material being annealed at intermediate temperatures under oxidizing conditions so as to remove intrinsic donors and activate impurity acceptors. It is noted that these steps are product-by-process limitations. These steps do not necessarily result in a structure different than that of Sato et al. and thus do not patentably distinguish over Sato et al.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

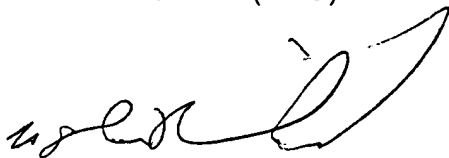
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2815

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571) 272-1736. The examiner can normally be reached on Monday-Friday 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



NDR



**JEROME JACKSON  
PRIMARY EXAMINER**